KPS Multicheck6010 Multifunction Tester Instruction Manual

Multicheck6010
Multifunction tester

Contents

Safety and operational considerations

1.1 Warnings and notes

In order to maintain the highest level of safety while working with the instrument, MGL EUMAN strongly recommends keeping your Multicheck6010 in good condition and undamaged.
When using the instrument, consider the following general warnings:

- The symbol means »Mark on your equipment certifies that it meets requirements of all subjected EU regulations.»

- The symbol means »This equipment should be recycled as electronic waste.»

- The symbol on the instrument means »Read the Instruction manual with special care for safe operation«. The symbol requires an action!»

  • The symbol means »Danger: risk of high voltage!»

- The symbol means »Class II: Double Insulated«. No need for safety connection to Earth.»

- If the test equipment is used in a manner not specified in this user manual, the protection provided by the equipment could be impaired!

- Read this user manual carefully, otherwise the use of the instrument may be dangerous for the operator, the instrument or for the equipment under test!

- Stop using the instrument or any of the accessories if any damage is noticed!

- If a fuse blows in the instrument, follow the instructions in this manual in order to replace it!

- Consider all generally known precautions in order to avoid risk of electric shock while dealing with hazardous voltages!

- Do not use the instrument in supply systems with voltages higher than 550 V!

- Service intervention or adjustment is only allowed to be carried out by competent authorized personnel!

- Use only standard or optional test accessories supplied by your distributor!

- The instrument comes supplied with rechargeable Ni-MH battery cells. The cells should only be replaced with the same type as defined on the battery compartment label or as described in this manual. Do not use standard alkaline battery cells while the power supply adapter is connected, otherwise they may explode!

- Hazardous voltages exist inside the instrument. Disconnect all test leads, remove the power supply cable and switch off the instrument before removing battery compartment cover.

- All normal safety precautions must be taken in order to avoid risk of electric shock while working on electrical

installations!

⚠️ Warnings related to measurement functions

Insulation resistance

- Insulation resistance measurement should only be performed on de-energized objects!
- When measuring the insulation resistance between installation conductors, all loads must be disconnected and all switches closed!
- Do not touch the test object during the measurement or before it is fully discharged! Risk of electric shock!
- Do not connect test terminals to external voltage higher than 550 V (AC or DC) in order not to damage the test instrument!

Continuity functions

- Continuity measurements should only be performed on de-energized objects!
- Parallel impedances or transient currents may influence test results.

Testing PE terminal

- If phase voltage is detected on the tested PE terminal, stop all measurements immediately and ensure the cause of the fault is eliminated before proceeding with any activity!

⚠️ Notes related to measurement functions

General

- The ! indicator means that the selected measurement cannot be performed because of irregular conditions on input terminals.
- Insulation resistance, continuity functions and earth resistance measurements can only be performed on de-energized objects.
- PASS / FAIL indication is enabled when limit is set. Apply appropriate limit value for evaluation of measurement results.
- In the case that only two of the three wires are connected to the electrical installation under test, only voltage indication between these two wires is valid.

Insulation resistance

- If voltages of higher than 10 V (AC or DC) are detected between test terminals, the insulation resistance measurement will not be performed.

Continuity functions

- If voltages of higher than 10 V (AC or DC) are detected between test terminals, the continuity resistance test will not be performed.
- Before performing a continuity measurement, compensate test lead resistance.

RCD functions

- Parameters set in one function are also kept for other RCD functions!
- The measurement of contact voltage does not normally trip an RCD. However, the trip limit of the RCD may be exceeded as a result of leakage current flowing to the PE protective conductor or a capacitive connection between L and PE conductors.
- The RCD trip-lock sub-function (function selector switch in LOOP position) takes longer to complete but offers much better accuracy of fault loop resistance (in comparison to the RL subresult in Contact voltage function).
- RCD trip-out time and current measurements will only be performed if the contact voltage in the pre-test at nominal differential current is lower than the set contact voltage limit!
- The auto-test sequence (RCD AUTO function) stops when trip-out time is out of allowable time period.

Loop impedance (with Loop RCD option)

- Isc depends on Z, Un and scaling factor
- The current limit depends on fuse type, fuse current rating, fuse trip-out time
- The specified accuracy of tested parameters is valid only if the mains voltage is stable during the measurement.
- Fault loop impedance measurements will trip an RCD.
- The measurement of fault loop impedance using trip-lock function does not normally trip an RCD. However, the trip limit may be exceeded as a result of leakage current flowing to the PE protective conductor or a capacitive connection between L and PE conductors.

Line impedance

- Isc depends on Z, Un and scaling factor
- The current limit depends on fuse type, fuse current rating, fuse trip-out time
- The specified accuracy of tested parameters is valid only if the mains voltage is stable during the measurement.

1.2 Batteries

⚠️ ⚡

When connected to an installation, the instruments battery compartment can contain hazardous voltage inside! When replacing battery cells or before opening the battery/fuse compartment cover, disconnect any measuring accessory connected to the instrument and turn off the instrument.

- Ensure that the battery cells are inserted correctly otherwise the instrument will not operate and the batteries could be discharged.
- If the instrument is not to be used for a long period of time, remove all batteries from the battery compartment.
- Rechargeable Ni-MH batteries (size AA) can be used. It is recommended only using of rechargeable batteries

with a capacity of 2300mAh or above.

- Do not recharge alkaline battery cells!

1.3 Precautions on charging of new battery cells or cells unused for a longer period
Unpredictable chemical processes can occur during the charging of new battery cells or cells that have been left unused for long periods of time (more than 3 months).

Notes:

- The charger in the instrument is a pack cell charger. This means that the cells are connected in series during the charging so all of them must be in similar state (similarly charged, same type and age).
- If even one deteriorated battery cell (or just one of a different type) can cause disrupted charging of the entire battery pack which could lead to overheating of the battery pack and a significant decrease in the operating time.
- If no improvement is achieved after performing several charging/discharging cycles, the state of each individual battery cells should be determined (by comparing battery voltages, checking them in a cell charger, etc). It is very likely that one or more of the battery cells could have deteriorated.
- The effects described above should not be mixed with the normal battery capacity decrease over time. All charging batteries lose some of their capacity when repeatedly charged/discharged.
  The actual decrease in capacity compared to the number of charging cycles depends on the battery type. This information is normally provided in the technical specification from battery manufacturer.
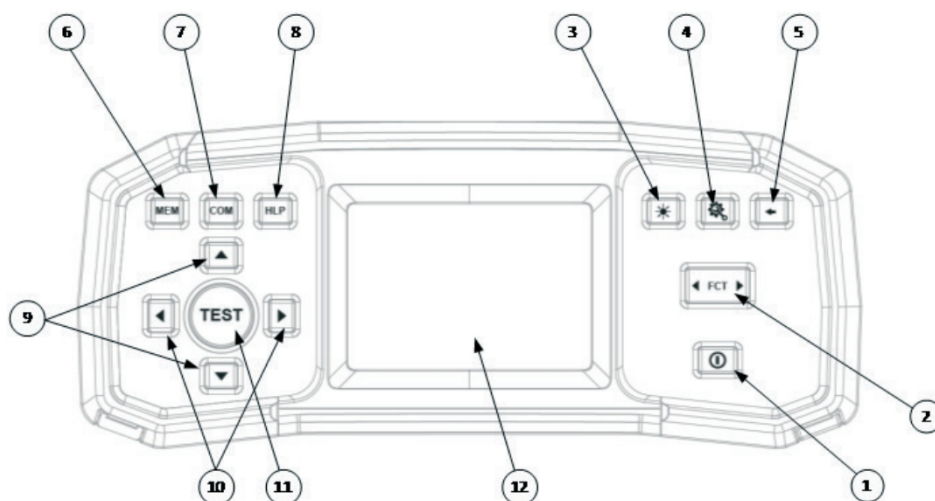
Instrument description

2.1 Front panel

Figure 2.1: Front panel

Legend:

1. – ON/OFF key, to switch the instrument on and off.
   The instrument will automatically switch off (APO) after the last key press and no voltage is applied.
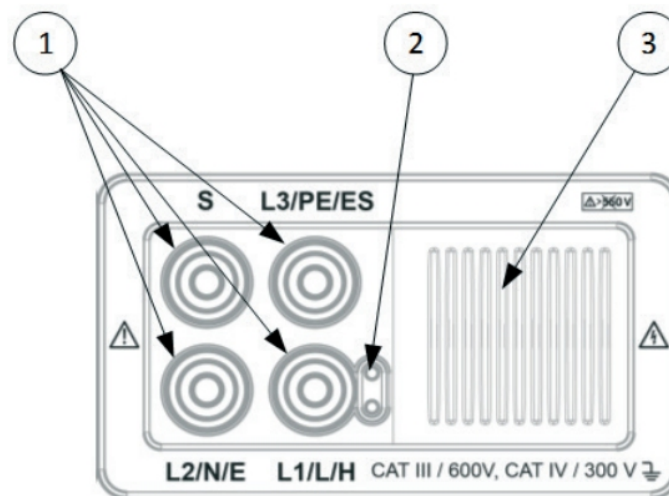2. – Function selector switch
3. – Backlight key (4 levels)

4. – Setup key

5. – Exit/Back/Return key

6. – Memory key

7. – Compensation key

To compensate for the test lead resistance in low-value resistance measurements.

8. – Help key

9. – Up and down keys

10. – Left and right keys

11. – TEST key for starting / confirmation tests.

12. – TFT color display

2.2 Connector panel

Figure 2.2: Connector panel

Leyenda:

1. – Test connector.
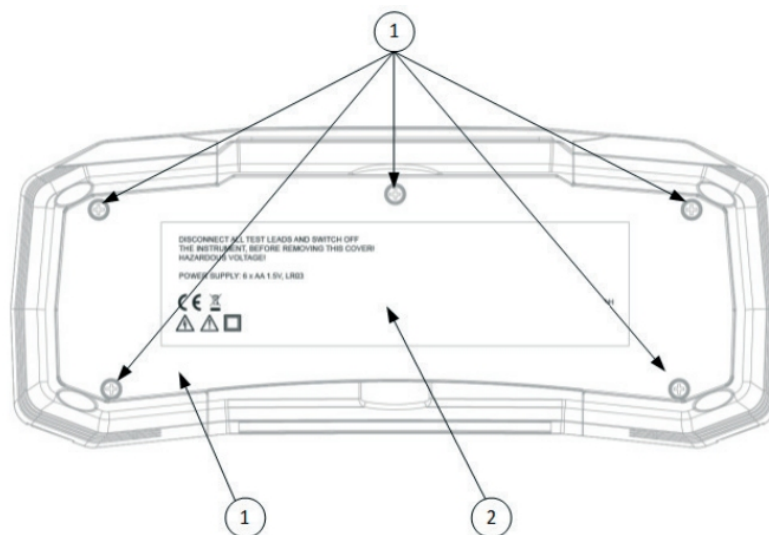2. – Socket for probe with Test push button
3. – Protection cover.

Figure 2.3: Back panel

Leyenda:

1. – Battery/fuse compartment cover.
2. – Information label.
3. – Fixing screws for battery/fuse compartment cover.

Instrument operation

3.1 Meaning of symbols and messages on the Instrument display
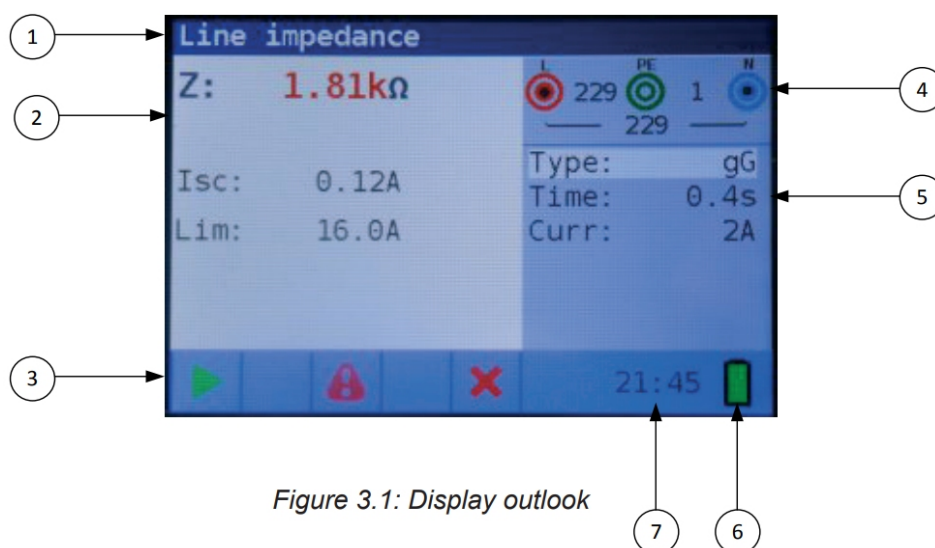The instrument display is divided into several sections:

Figure 3.1: Display outlook

Legend:

1. – Function line.
2. – Result field.

   In this field the main result and sub-results are displayed.
3. – Status field

   PASS/FAIL/ABORT/START/WAIT/WARNINGS status are displayed.

4. – Online voltage and output monitor.

   Shows symbolized plugs, names the plugs depending on the measurements, always shows the actual voltages.

5. – Options field

6. – Battery status indication

7. – Current time

3.2 The online voltage and output terminal monitor

	Online voltages are displayed together with test terminal indication. All three test terminals are used for selected measurement.
	Online voltages are displayed together with test terminal indication. L and N test terminals are used for selected measurement.

3.3. Message field – battery status

	Battery power indication.
	Low battery indication. Battery pack is too weak to guarantee correct result. Replace the batteries. Recharging is shown by a LED near the supply socket.

3.4 Status field – measurement warnings/results symbols

Symbol	Meaning	Active in function											
		Voltage Rotation	R low	Continuity	R isolation	Line	Loop	Loop RCD	RCD time	RCD current	RCD auto	RCD Uc	Earth resistance
⚠	Dangerous voltage	x	x	x	x	x	x	x	x	x	x	x	x
COMP	Test leads are compensated		x	x									
!	Measurement cannot be started		x	x	x								
N	Dangerous voltage on PE	x	x	x	x	x	x	x	x	x	x	x	x
✖	Result is not OK		x	x	x	x	x	x	x	x	x	x	x
✔	Result is OK		x	x	x	x	x	x	x	x	x	x	x
𝟞𝟘	RCD open or tripped								x	x	x	x	
𝟘𝟘	RCD closed								x	x	x	x	
▶	Measurement can be started		x	x	x	x	x	x	x	x	x	x	x
🌡	Temperature too high					x	x	x	x	x	x	x	
⇄	Swap test leads	x	x	x	x	x	x	x	x	x	x	x	x
⧗	Wait				x								

Figure 3 2 List of status symbols

3.5 Sound warnings

Short high sound	button pressed
Continued sound	during continuity test when result is <35 Ohm
Upwards sound	attention, dangerous voltage applied
Short sound	power off, end of measurement
Downwards sound	warnings (temperature, voltage at input, start not possible)
Periodic sound	**Warning!** Phase voltage on the PE terminal! Stop all the measurements immediately and eliminate the fault before proceeding with any activity!

3.6 Performing measurement

3.6.1 Measurement function/ sub-function
The following measurements can be selected with the function selector switch:

- Voltage/rotation/frequency measurement
- Earth resistance
- R Low
- R Insulation
- Line impedance
- Loop (Loop RCD) impedance

- RCD

The function/sub-function name is highlighted on the display by default.

3.6.2 Selecting measurement function/ sub-function
Using navigation keys ▲ ▼ select the parameter/limit value you want to edit. By using ◆► keys the value for the selected parameter can be set.o.
Once the measurement parameters are set, the settings are retained until new changes are made.

3.6.3 Performing tests

When ▶ symbol is displayed test can be started by pressing the "TEST" button. After completion of the test its result value and status will be displayed. In case of PASSED measurement, result value will be displayed in black color along with the ✔ status symbol. In case of NOT PASSED measurement, the result value will be marked in red color along with the ✖ symbol.

3.7 Setup menu
To enter the Setup menu, press the SETUP key. In the Setup menu, the following actions can be taken:

• Isc factor:	Set prospective short/fault current scaling factor
• Date/Time:	Set internal date and time
• Start function:	Selected function will start when switched on
• RCD standard:	Select national standard for RCD testing, e.g EN61008 or BS7671
• ELV:	Select voltage for ELV warning.
• Power off time:	Select time when device should switch off if not used.
• Cont timeout:	Select time-out when measurement should stop automatically.
• ISO timeout:	Select time-out when measurement should stop automatically.
• Supply system:	Select supply network/system, e.g. TN or IT.
• Device info:	Shows info about device, e.g. Firmware version

3.8. Help Screen
The Help screens contain diagrams that show the correct use of the device.
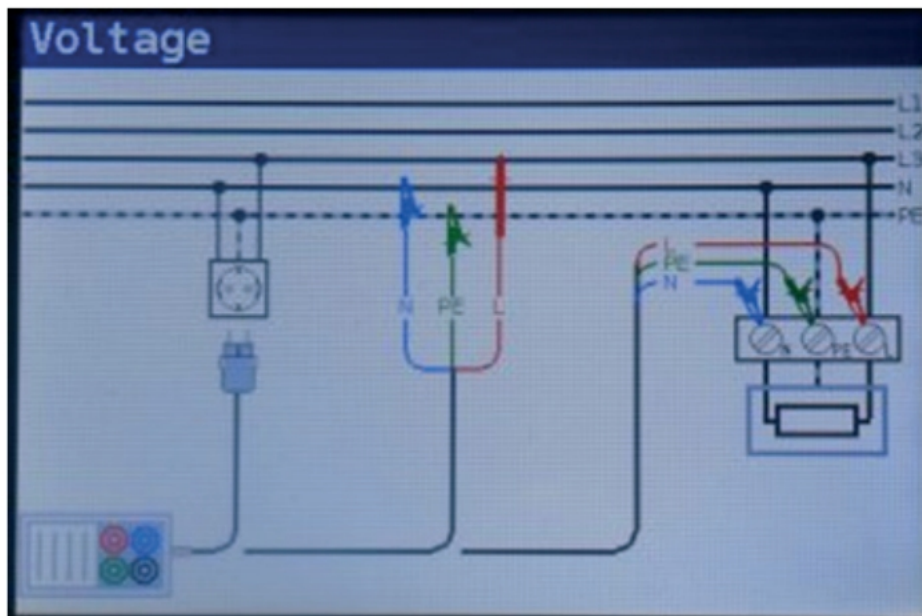
Figure 3 3: example of a help screen

Press the HLP key to enter the help screen
Press the HLP key or the Exit/Back/Return key to exit the help screen
Press the Left and Right keys to switch to previous/next help screen

Measurements

4.1 Insulation resistance
How to perform an insulation resistance measurement
Step 1 Select Insulation function with the function selector FCT key. The following menu is displayed:

Figure 4 1: Insulation resistance measurement menu

Step 2 Set the following measuring parameter and limit values:

- **Volt:** Nominal test voltage
- **Límite:** Low limit resistance value

Step 3 Ensure that no voltages are present on the item for testing. Connect the test leads to the instrument.

Connect the test cables to the item under test. (see figure 4.2) to perform insulation resistance measurement.
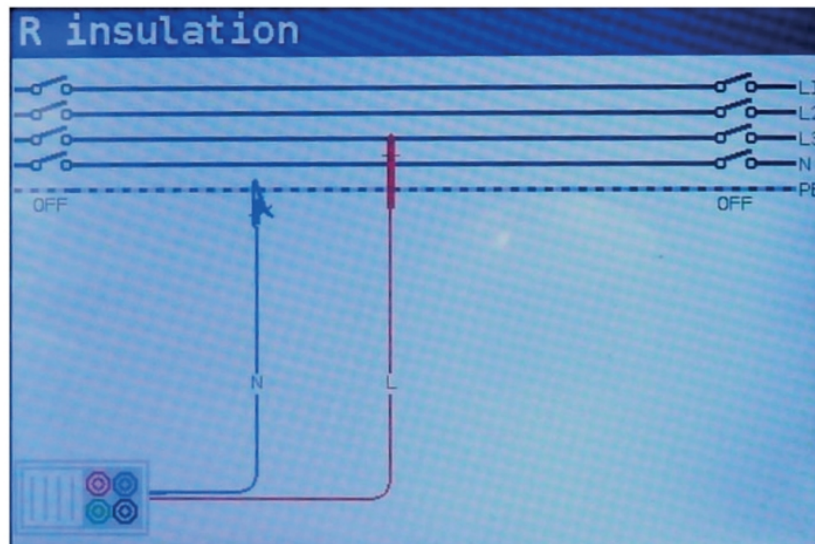
Figure 4 2: Connection of universal test cable
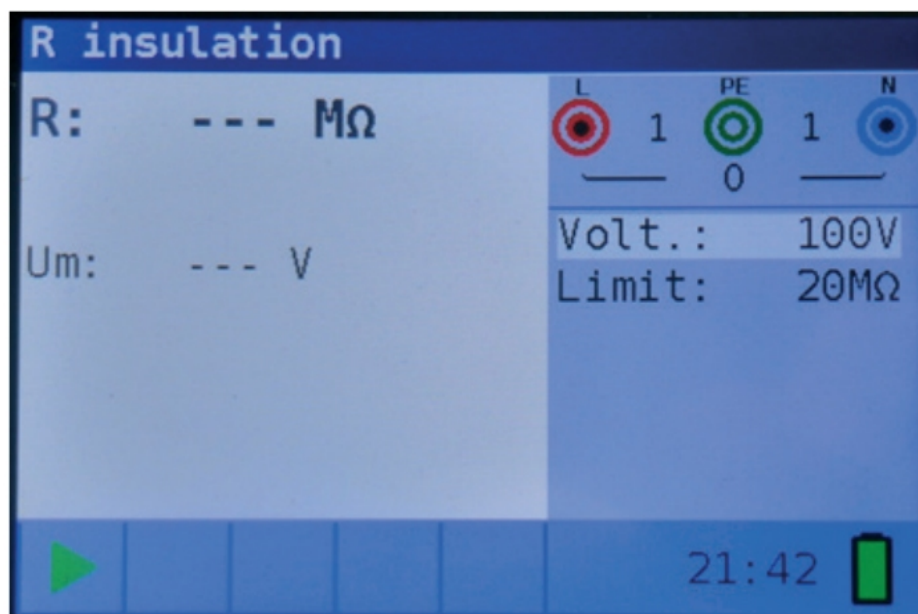
Step 4 Check the displayed warnings and online voltage/terminal monitor before starting the measurement. If ▶ is displayed, press the TEST key.

After the test is done, measured results are displayed, together with the ✔ or ✖ indication (if applicable).

Figure 4 3: Example of insulation resistance measurement results

Displayed results:
R Insulation resistance
Um Actual voltage applied to item under test

Warnings:

- Insulation resistance measurement should only be performed on de-energized objects!
- When measuring the insulation resistance between installation conductors, all loads must be disconnected and all switches closed!
- Do not touch the test object during the measurement or before it is fully discharged! Risk of electric shock!
- In order to prevent damaging the test instrument, do not connect test terminals to an external voltage higher than 550 V (AC or DC).

4.2 Continuity

Two continuity sub-functions are available:

- R Low, ca. 240mA continuity test with automatic polarity reversal.
- Low current (ca. 4mA) continuous continuity test, useful when testing inductive systems.

4.2.1 R low test
How to perform a R Low resistance measurement

Step 1 Select the Continuity function with the FCT key and select the R Low mode with the ▲ ▼ and ◄► navigation keys. The following menu will be displayed:
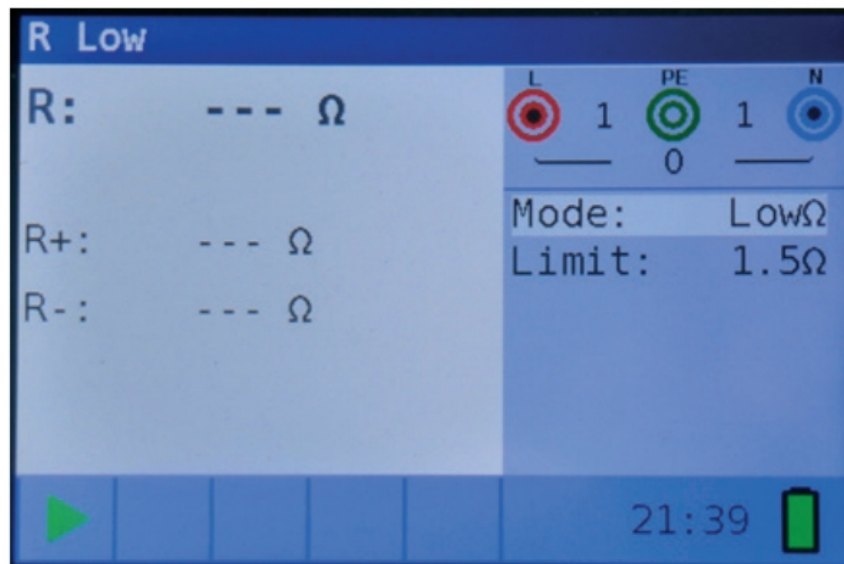
Figure 4 4: R Low resistance measurement menu

Step 2 Ajuste el siguiente valor límite:

- **Límit:** limit resistance value using the ▲ ▼ and ◄► navigation keys.

Step 3 Connect test cable to MUlticheck6010. Before performing an R Low resistance measurement, compensate for the test leads resistance as follows:

1. Short test leads first as shown in figure 4.5.

Figure 4 5: Shorted test leads

2. Press the COM key. After performing test leads compensation the compensated test leads indicator COMP will be displayed in the status line.

3. In order to remove any test lead resistance compensation, just press the COM key again. After removing any test lead compensation, the compensation indicator will disappear from the status line.

Step 4 Ensure that the item for testing is disconnected from any voltage source and it has been fully discharged. Connect the test cables to the item under test.
Follow the connection diagrams shown in figure 4.6 to perform a R Low resistance measurement.
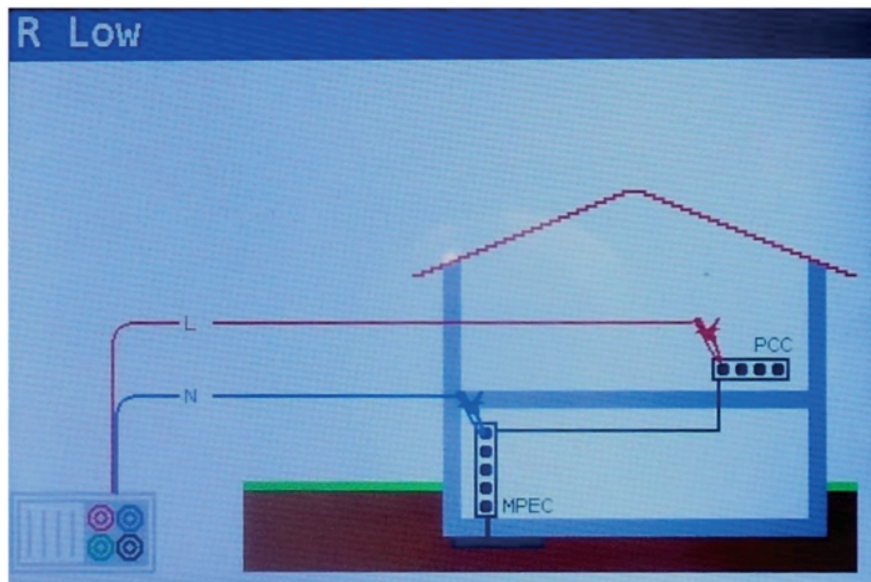
Figure 4 6: Connection of universal test cable

Step 5 Check for any warnings and the online voltage/terminal monitor on the display before starting the measurement. If everything is ok and the ▶ is shown, press the TEST key.

After performing the measurement, the results appear on the display together with the ✔ or ✖ indication (if applicable).

Figure 4 7: Examples of R Low resistance measurement results

Displayed results:
R Main LowΩ resistance result (average of R+ and R- results)
R+ LowΩ resistance sub-result with positive voltage at L terminal
R- LowΩ resistance sub-result with positive voltage at N terminal

Warnings:

- Low-value resistance measurements should only be performed on de-energized objects!
- Parallel impedances or transient currents may influence test results.

Note:

- If voltage between test terminals is higher than 10 V the R Low measurement will not be performed.

4.2.2 Continuity test
How to perform low current continuity measurement
Step 1 Select the Continuity function with the FCT key and select the Cont mode with the ▲ ▼ and ◄►navigation keys. The following menu will be displayed:
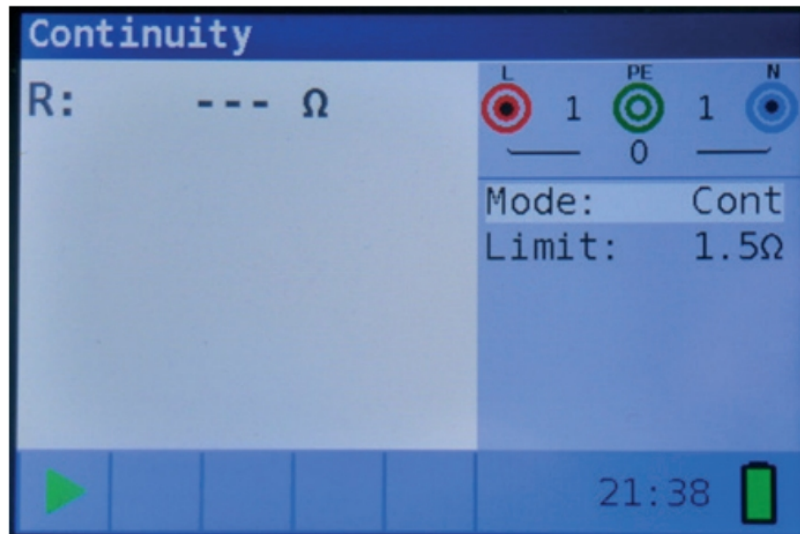

Figure 4 8: Continuity measurement menu

Step 2 Set the following limit value:

- Límit: limit resistance value using the ▲ ▼ and ◄► navigation keys.

Step 3 Connect test cable to the instrument and the item under test. Follow the connection diagram shown in figure 4.9 to perform the Continuity measurement.
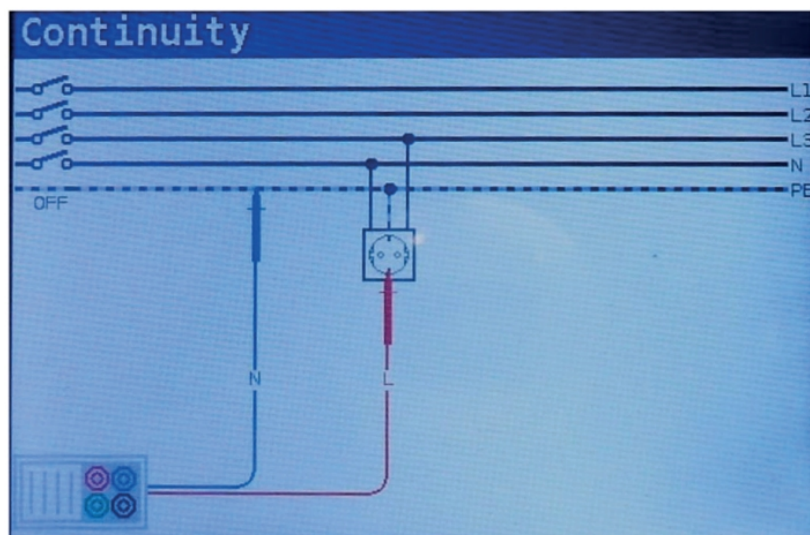
Figure 4 9: Connection of universal test cable

Step 4 Check the warnings and online voltage/terminal monitor on the display before starting the measurement. If everything is OK and the ▶ is shown, press the TEST key to start the measurement. The actual measuring result with ✔ or ✖ indication (if applicable) will be displayed during the measurement.
As this is a continuous test, the function will require stopping. To stop the measurement at any time press the TEST key again. The last measured result will be displayed together with the ✔ or ✖ indication (if applicable).
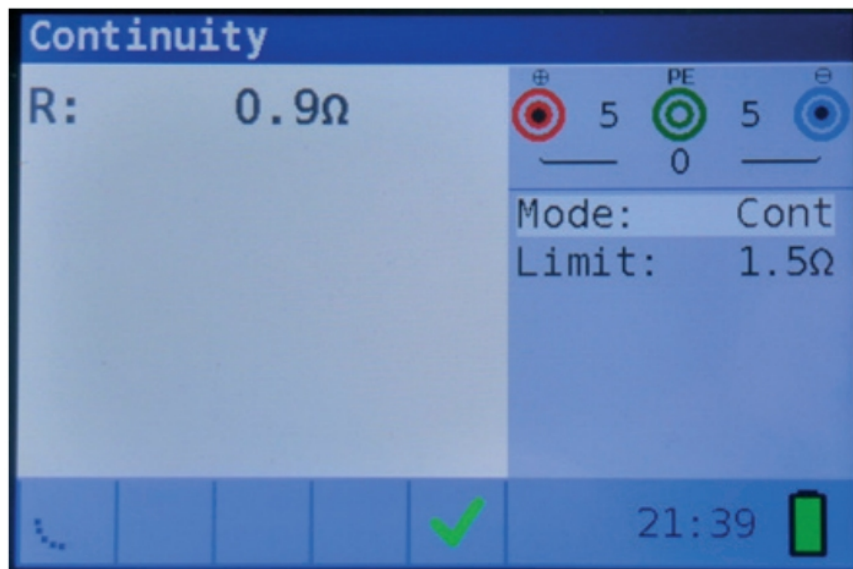
Figure 4 10: Example of Low current continuity measurement result

Displayed result:
R Low current continuity resistance result
I Current used in the measurement

Warning:

- Low current continuity measurement should only be performed on de-energized objects!

Notes:

- If a voltage of higher than 10 V exists between test terminals, the continuity measurement will not be performed.
- Before performing a continuity measurement, compensate for the test lead resistance (if necessary). The compensation is performed in Continuity sub- function R LowΩ.

4.3 Testing RCDs
When testing RCDs, the following sub-functions can be performed:

- Contact voltage measurement,
- Trip-out time measurement,
- Trip-out current measurement,
- RCD autotest.

In general, the following parameters and limits can be set when testing RCDs:

- Limit contact voltage,
- Nominal differential RCD trip-out current,
- Multiplier of nominal differential RCD trip-out current,
- RCD type,
- Test current starting polarity.

4.3.1 Contact voltage
How to perform contact voltage measurement

Step 1 Select the RCD function with the FCT key and select the Uc mode with the ▲ ▼ and ◆ navigation keys. The following menu will be displayed:
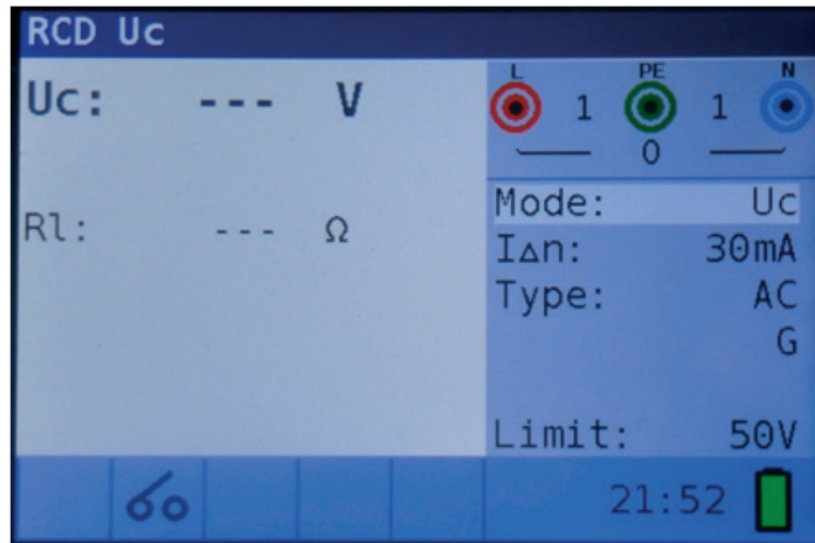
Figure 4 11: Contact voltage measurement menu

Step 2 Set the following measuring parameters and limit values:

- IΔN: Nominal residual current
- Tipo: RCD type,
- Límite: Limit contact voltage.

Step 3 Connect the test leads to the instrument and follow the connection diagram shown in figure 4.12 to perform contact voltage measurement.
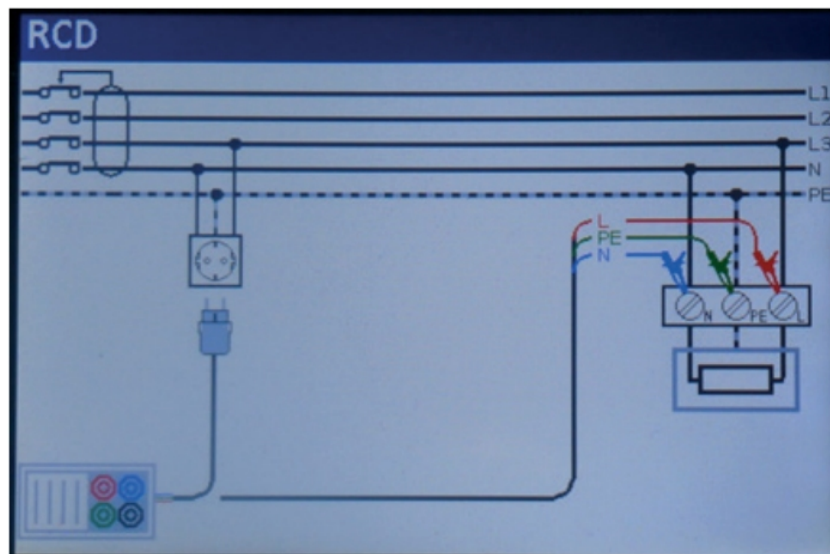
Figure 4 12: Connection of plug test cable or universal test cable

Step 4 Check for any warnings and check the online voltage/terminal monitor on the display before starting the measurement. If everything is ok and the ▶ is shown, press the TEST key. After performing the measurement, the results appear on the display together with the ✔ or ✘ indication.

Figure 4 13: Example of contact voltage measurement results

Displayed results:
Uc Contact voltage
RI Fault loop resistance
Limit Limit earth fault loop resistance value according to BS 7671.

Notes:

- Parameters set in this function are also kept for all other RCD functions!
- The measurement of contact voltage does not normally trip an RCD. However, the trip limit may be exceeded as a result of leakage currents flowing through the PE protective conductor or a capacitive connection between the L and PE conductor.
- RCD trip-lock sub-function (function selected to LOOP RCD option) takes longer to complete but offers much better accuracy of a fault loop resistance result (in comparison with the RL subresult in Contact voltage function).

4.3.2 Trip-out time
How to perform trip-out time measurement
Step 1 Select the RCD function FCT key and select the Time mode with the ▲ ▼ and ◆▶ navigation keys. The following menu will be displayed:
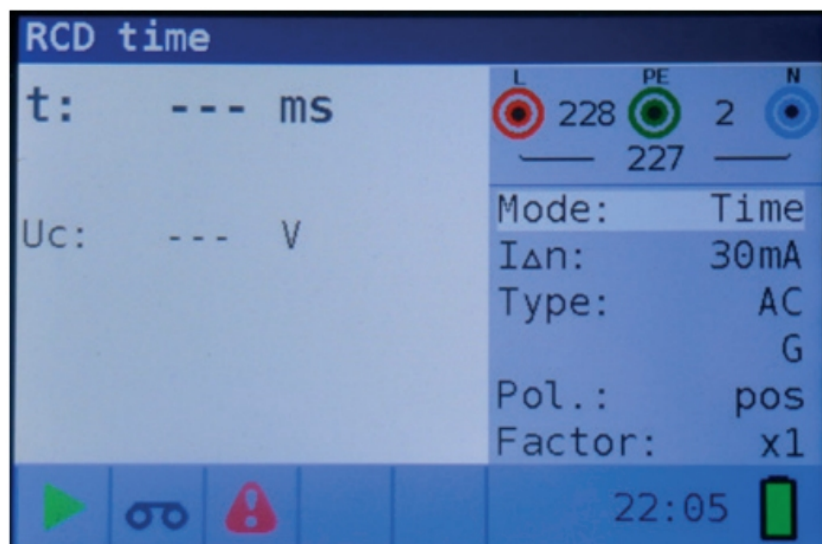
Figure 4 14: Trip-out time measurement menu

Step 2 Set the following measuring parameters:

- **IΔN:** Nominal differential trip-out current
- **Factor:** Nominal differential trip-out current multiplier
- **Type:** RCD type
- **Pol.:** Test current starting polarity

Step 3 Connect the leads to the instrument and follow the connection diagram shown in figure 4.12 (see the chapter 4.3.1 Contact voltage) to perform trip-out time measurement.

Step 4 Check for any warnings and check the online voltage/terminal monitor on the display before starting the measurement. If everything is ok and the ▶ is shown, press the TEST key. After performing the measurement, the results appear on the display together with the ✔ or ✘ indication.
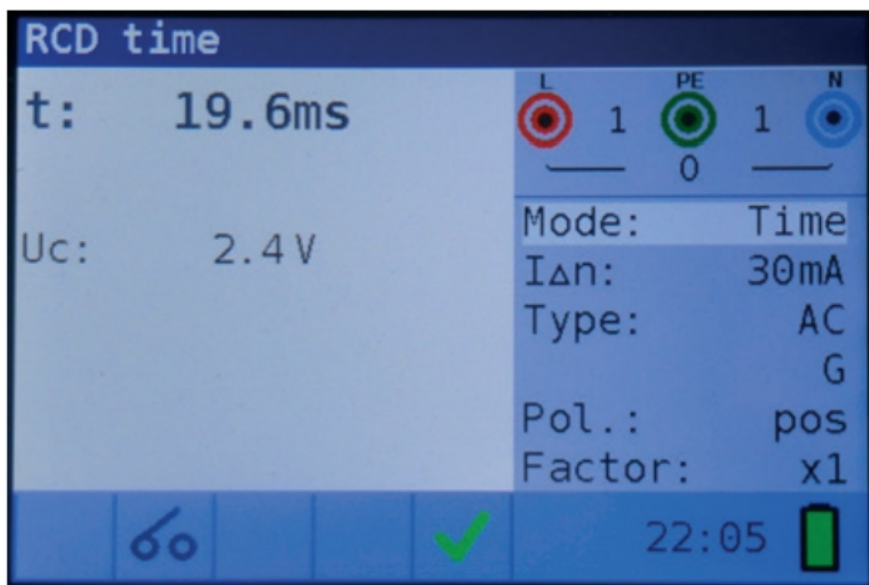
Figure 4-15: Example of trip-out time measurement results

Displayed results:
t Trip-out time
UC Contact voltage

Notes:

- Parameters set in this function are also transferred onto all other RCD functions!
- RCD trip-out time measurement will be performed only if the contact voltage at nominal differential current is lower than the limit set in the contact voltage setting!
- The measurement of the contact voltage in pre-test does not normally trip an RCD. However, the trip limit may be exceeded as a result of leakage current flowing through the PE protective conductor or a capacitive connection between L and PE conductors

4.3.3 Trip-out current
How to perform trip-out current measurement
Step 1 Select the RCD function FCT key and select the Ramp mode with the ▲ ▼ and ◀▶ navigation keys. The following menu will be displayed:

Figure 4 16: Trip-out current measurement menu

Step 2 By using cursor keys the following parameters can be set in this measurement:

- IΔN: Nominal residual current
- Type: RCD type
- Pol.: Test current starting polarity

Step 3 Connect the test leads to the instrument and follow the connection diagram shown in figure 4.12 (see the chapter 4.3.1 Contact voltage) to perform trip- out current measurements.
Step 4 Check for any warnings and check the online voltage/terminal monitor on the display before starting the measurement. If everything is ok and the ▶ is shown, press the TEST key. After performing the measurement, the results appear on the display together with the ✔ or ✘ indication.

Figure 4 17: Example of trip-out current measurement result

Displayed results:

I Trip-out current
Uci Contact voltage
t Trip-out time

Notes:

- Parameters set in this function are also kept for other RCD functions!
- RCD trip-out current measurement will be performed only if the contact voltage at nominal differential current is lower than set limit contact voltage!
- The measurement of contact voltage in the pre-test does not normally trip an RCD. However, the trip limit may be exceeded as a result of leakage current flowing through the PE protective conductor or a capacitive connection between L and PE conductors.

4.3.4 Autotest
How to perform RCD autotest
Step 1 Select the RCD function FCT key and select the Auto mode with the ▲ ▼ and ◀▶ navigation keys. The following menu will be displayed:

Figure 4 18: RCD autotest menu

Step 2 Set the following measuring parameters:

- IΔN: Nominal differential trip-out current
- Tipo: RCD type

Step 3 Connect the test leads to the instrument and follow the connection diagram shown in figure 4.12 (also see the chapter 4.3.1 Contact voltage) to perform the RCD autotest.

Step 4 Check for any warnings and check the online voltage/terminal monitor on the display before starting the measurement. If everything is ok and the ▶ is shown, press the TEST key. The autotest sequence will then start to run as follows:

1. Trip-out time measurement a test current of IΔN, started with the positive half-wave at 0º. Measurement normally trips an RCD within allowed time period.
   The following menu is displayed:
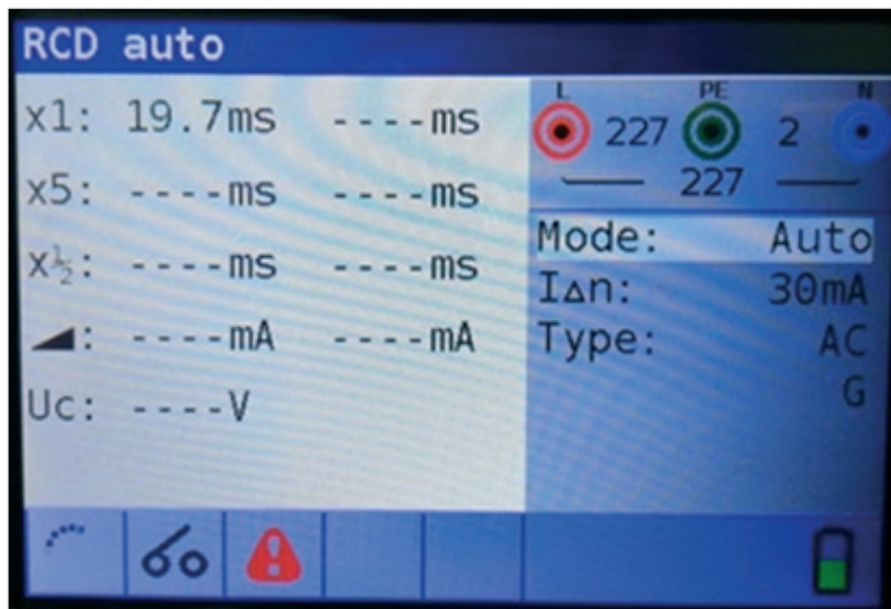
Figure 4 19: Step 1 RCD autotest results

After re-activating the RCD, the autotest sequence automatically proceeds with step 2.

2. The following steps are indicated below:

• Trip-out time measurement a test current of IΔN, started with the negative half-wave at 180º. Measurement normally trips an RCD.

• Trip-out time measurement with a test current of 5x IΔN, started with the positive halfwave at 0º. Measurement normally trips an RCD within allowed time period.

• Trip-out time measurement with a test current of 5x IΔN, started with the negative halfwave at 180º. Measurement normally trips an RCD within allowed time period.

• Trip-out time measurement with a test current of ½x IΔN, started with the positive halfwave at 0º. Measurement does not normally trip an RCD.

• Trip-out time measurement with a test current of ½x IΔN, started with the negative halfwave at 180º. Measurement does not normally trip an RCD.

• Ramp test measurement with a test current started with the positive half-wave at 0º. This measurement determine the minimum current required to trip the RCD.

• Ramp test measurement with a test current started with the negative half-wave at 180º. This measurement determine the minimum current required to trip the RCD.

In those measurement when the RCD is tripped, it is necessary to re-activate it before the autotest sequence automatically proceeds with the next step.
The final menu is displayed:

Figure 4 20: Step 8 RCD autotest results

Displayed results:

x1 (left)	Step 1 trip-out time result, t3 (IΔN, 0º),
x1 (right)	Step 2 trip-out time result, t4 (IΔN, 180º),
x5 (left)	Step 3 trip-out time result, t5 (5x IΔN, 00),
x5 (right)	Step 4 trip-out time result, t6 (5x IΔN, 1800),
x½ (left)	Step 5 trip-out time result, t1 (½xIΔN, 00),
x½ (right)	Step 6 trip-out time result, t2 (½xIΔN, 1800),
IΔ (+)	Step 7 trip-out current ((+) positive polarity)
IΔ (-)	Step 8 trip-out current ((-) negative polarity)
Uc	Contact voltage for rated IΔN.

Note:

- the x1 Auto tests will be automatically skipped for RCD type B with rated residual currents of IΔN = 1000 mA
- the x5 Auto tests will be automatically skipped in the following cases:
- RCD type AC with rated residual currents of IΔN = 1000 mA
- RCD type A and B with rated residual currents of IΔN >= 300 mA
- In these cases, the auto test result passes if the t1 to t4 results pass, and on the display are omitted t5 and t6.

4.3.5 Warnings

- Leakage currents in the circuit following the residual current device (RCD) may influence the measurements.
- Special conditions in residual current devices (RCD) of a particular design, for example of type S (selective and resistant to impulse currents) shall be taken into consideration.
- Equipment in the circuit following the residual current device (RCD) may cause a considerable extension of the operating time. Examples of such equipment might be connected capacitors or running motors.

4.4 Fault loop impedance and prospective fault current

The loop impedance function has two sub-functions available:

LOOP IMPEDANCE sub-function performs a fast fault loop impedance measurement on supply systems which do not contain RCD protection.

LOOP IMPEDANCE RCD trip-lock sub-function performs fault loop impedance measurement on supply systems which are protected by RCDs

4.4.1 Fault loop impedance

How to perform fault loop impedance measurement

Step 1 Select the LOOP function with the function selector FCT key and select the LOOP mode with the ▲ ▼ and ◄► navigation keys. Then select desired Type, Time and Curr option values with the ▲ ▼ and ◄► navigation keys. The following menu is displayed:

Figure 4 21: Loop impedance measurement menu

Step 2 Connect the test leads to the instrument and follow the connection diagram shown in the figure 4.22 to perform fault loop impedance measurement.
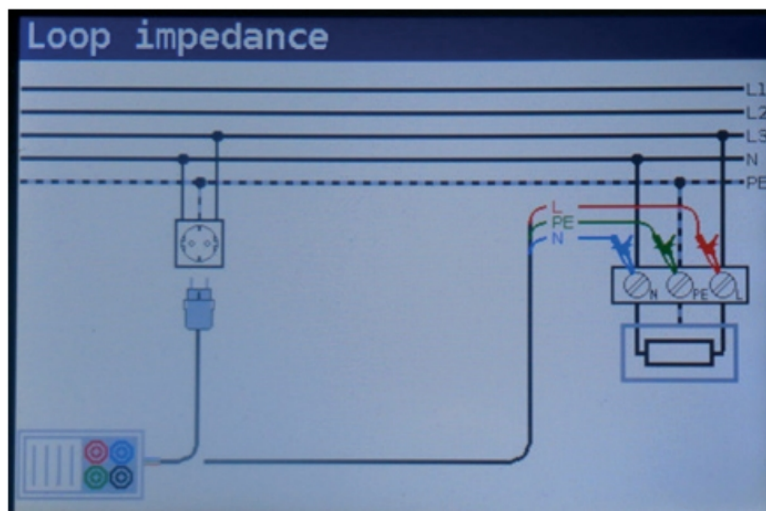

Figure 4 22: Connection of plug cable and universal test cable

Step 3 Check for any warnings displayed on the screen and check the online voltage/terminal monitor before starting the measurement. If everything is ok and the ▶ is shown, press the TEST key. After performing the measurement, the test results will appear on the display.

Figure 4 23: Example of loop impedance measurement results

Displayed results:
Z Fault loop impedance
ISC Prospective fault current (displayed in amps)

Notes:

- The specified accuracy of test parameters is valid only if mains voltage is stable during the measurement.
- The Fault loop impedance measurement trips RCD protected circuits.

4.4.2 The fault loop impedance test for RCD protected circuits
How to perform RCD trip-lock measurement

Step 1 Select the LOOP function with the function selector FCT key and select the LOOP mode with the ▲ ▼ and ◆ navigation keys. Then select desired Type, Time and Curr option values with the ▲ ▼ and ◆ navigation keys. The following menu is displayed:
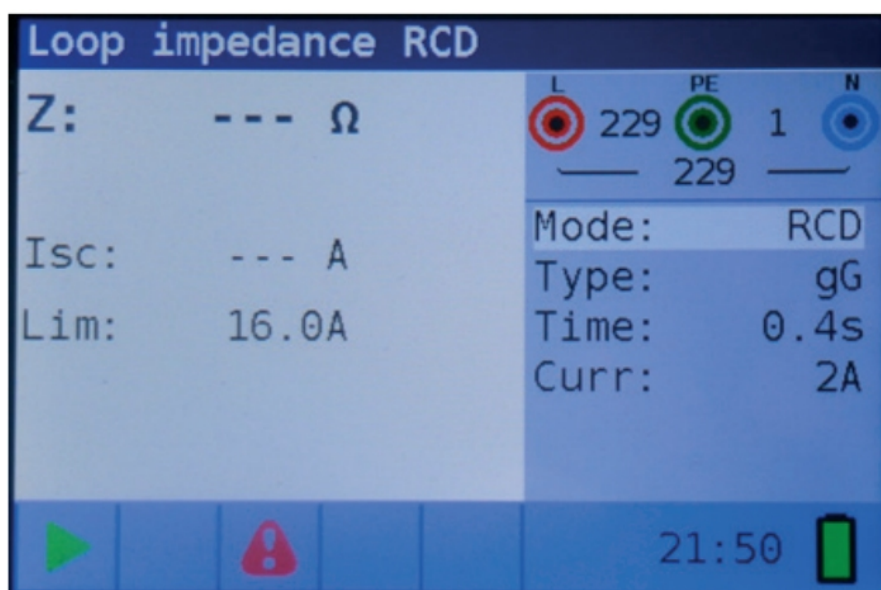

Figure 4 24: Trip-lock function menu

Step 2 Connect the appropriate test leads to the instrument and follow the connection diagram shown in figure 4.12 to perform RCD trip-lock measurement (see chapter 4.3.1 Contact voltage).
Step 3 Check for warnings on the display and check the online voltage/terminal monitor before starting the

measurement. If everything is ok and the ▶ is shown, press the TEST key. After performing the measurement, the results will appear on the display.

Figure 4 25: Example of fault loop impedance measurement results using trip-lock function

Displayed results:
Z Fault loop impedance
ISC Prospective fault current

Notes:

- The measurement of fault loop impedance using trip-lock function does not normally trip an RCD. However, if the trip limit may be exceeded as a result of leakage current flowing through the PE protective conductor or a capacitive connection between L and PE conductors.
- The specified accuracy of test parameter is valid only if mains voltage is stable during the measurement.

4.5 Line impedance and prospective short-circuit current
How to perform line impedance measurement

Step 1 Select the LINE IMPEDANCE function with the function selector FCT key Then select desired Type, Time and Curr option values with the ▲ ▼ and ◄► navigation keys. The following menu is displayed:
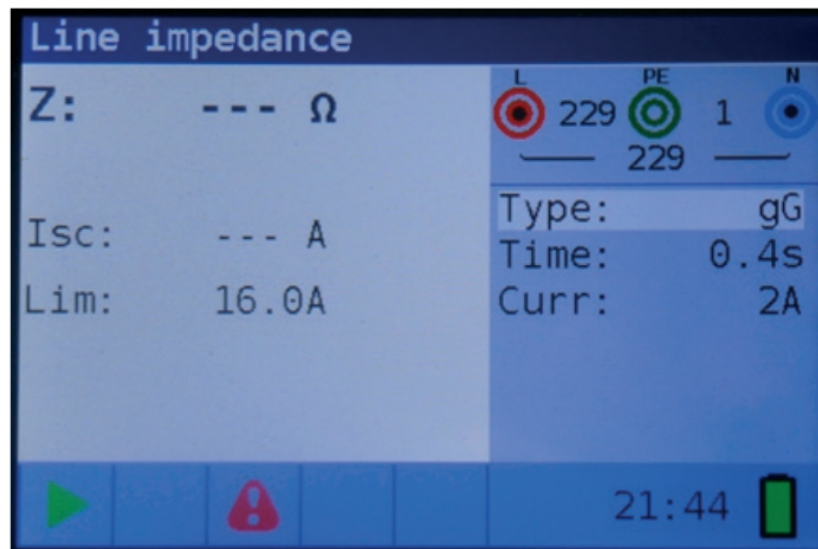
Figure 4 26: Line impedance measurement menu

Step 2 Connect the appropriate test leads to the instrument and follow the connection diagram shown in figure 4.27 to perform phase-neutral or phase- phase line impedance measurement.
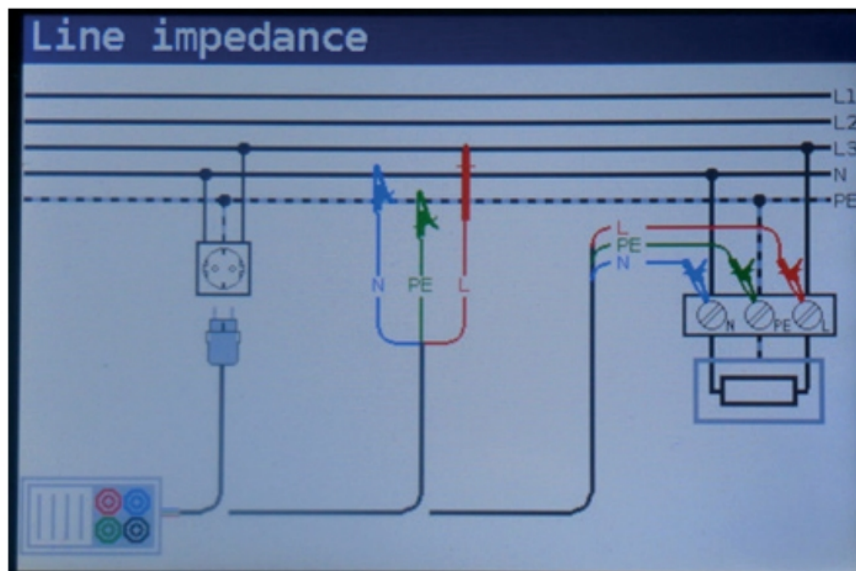
Figure 4 27: Line impedance measurement

Step 3 Check for warnings displayed on the screen and check the online voltage/terminal monitor before starting the measurement. If everything is ok and the ▶ is shown, press the TEST key. After performing the measurement, the results will appear on the display.

Figure 4 28: Example of line impedance measurement results

Displayed results:
Z Line impedance
ISC Prospective short-circuit current

Notes:

- The specified accuracy of the test parameter is valid only if mains voltage is stable during the measurement.

4.6 Phase sequence testing
How to test the phase sequence

Step 1 Select the VOLTAGE function with the function selector FCT key. The following menu is displayed:

Figure 4-29: Phase rotation test menu

Step 2 Connect test cable to the instrument and follow the connection diagram shown in figure 4.30 to test phase sequence.
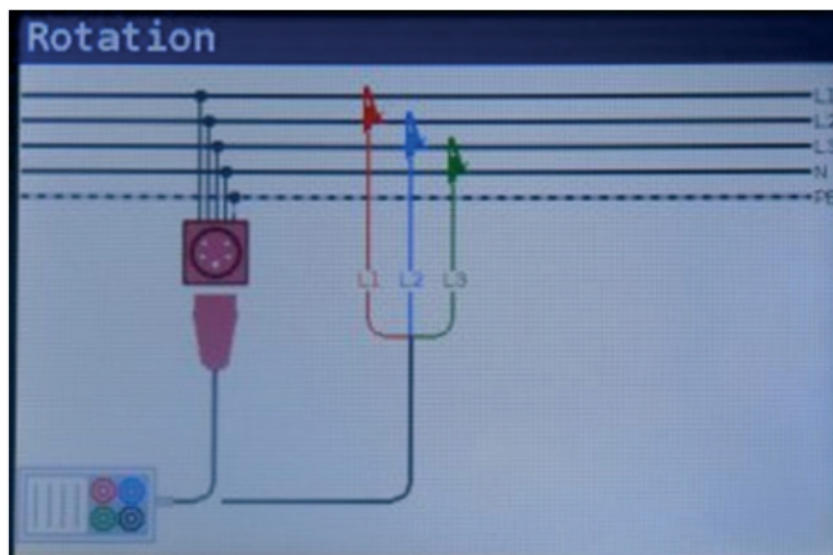
Figure 4-30: Connection of universal test cable and optional three phase cable

Step 3 Check for warnings on the display and check the online voltage/terminal monitor. The phase sequence test is a continuously running test hence the results will be displayed as soon as the full test lead connection to the item under test has been made. All three- phase voltages are displayed in order of their sequence represented by the numbers 1, 2 and 3.
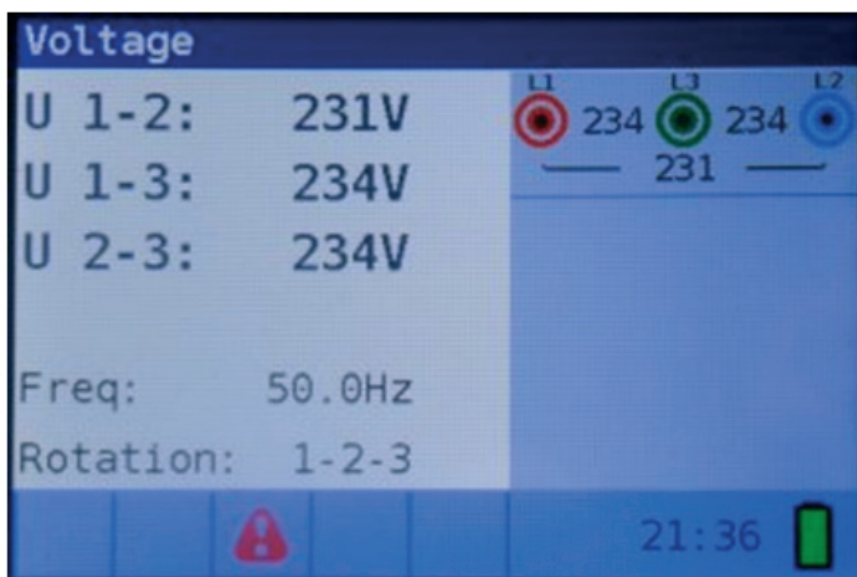
Figure 4 31: Example of phase sequence test result

Displayed results:

Frec	Frequency
Rotation	Phase sequence
-.-.-	Irregular rotation value

4.7 Voltage and frequency
How to perform voltage and frequency measurement
Step 1 Select the VOLTAGE function with the function selector FCT key. The following menu is displayed:
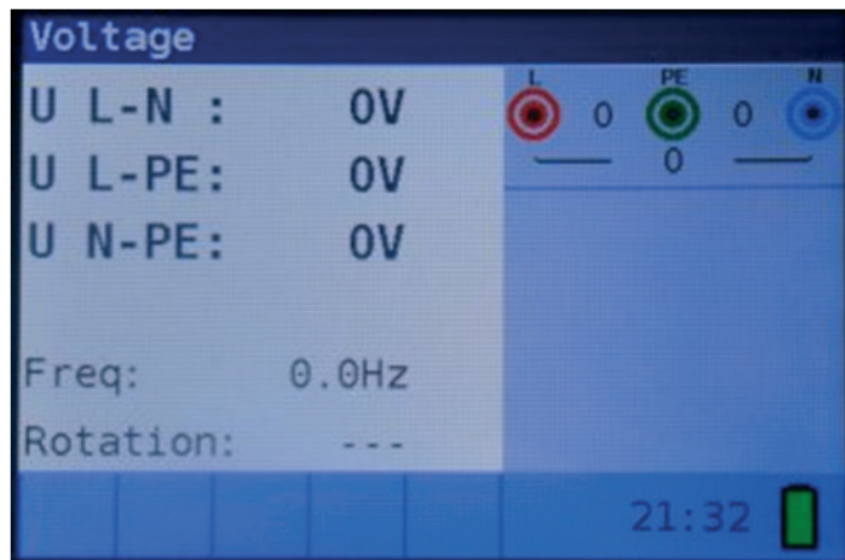
Figure 4 32: Voltage and frequency measurement menu

Step 2 Connect test cable to the instrument and follow the connection diagram shown in figure 4.33 to perform a voltage and frequency measurement.
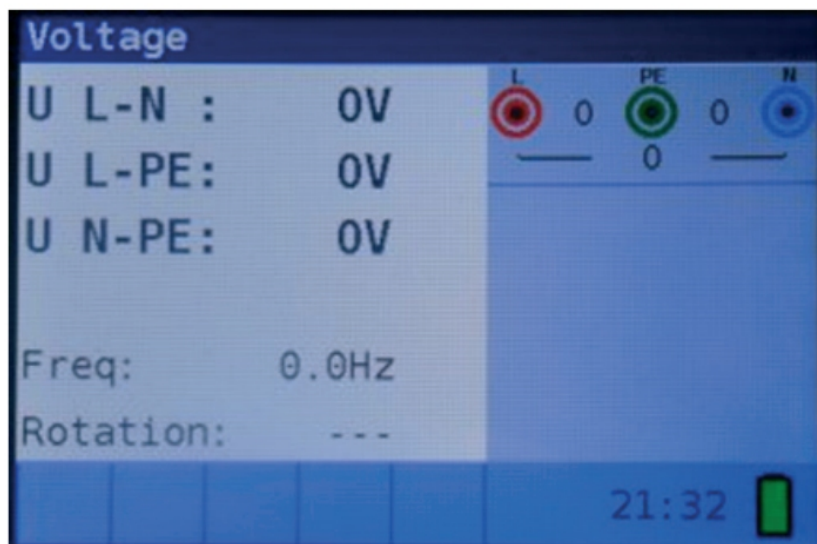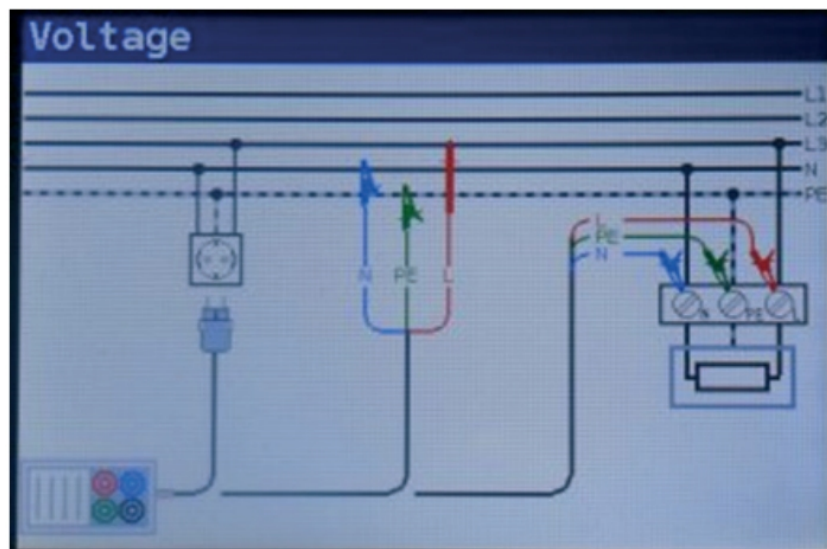

Figure 4 33: Connection diagram

Step 3 Check the displayed warnings. The Voltage and Frequency test continually runs, showing fluctuations as they occur, these results are shown on the display during measurement.

Figure 4 34: Examples of voltage and frequency measurements

Displayed results:

U L-N	Voltage between phase and neutral conductors
U L-PE	Voltage between phase and protective conductors
U N-PE	Voltage between neutral and protective conductors

When testing three-phase system the following results are displayed:

U 1-2	Voltage between phases L1 and L2
U 1-3	Voltage between phases L1 and L3
U 2-3	Voltage between phases L2 and L3

4.8 Earth Resistance
4.8.1 Earth Resistance (Re) – 3-wire, 4wire
How to perform Earth Resistance measurement
**Step 1** Select the Earth Resistance function with the function selector FCT key and select the Re mode with the ▲▼ and ◀▶ navigation keys. The following menu will be displayed:
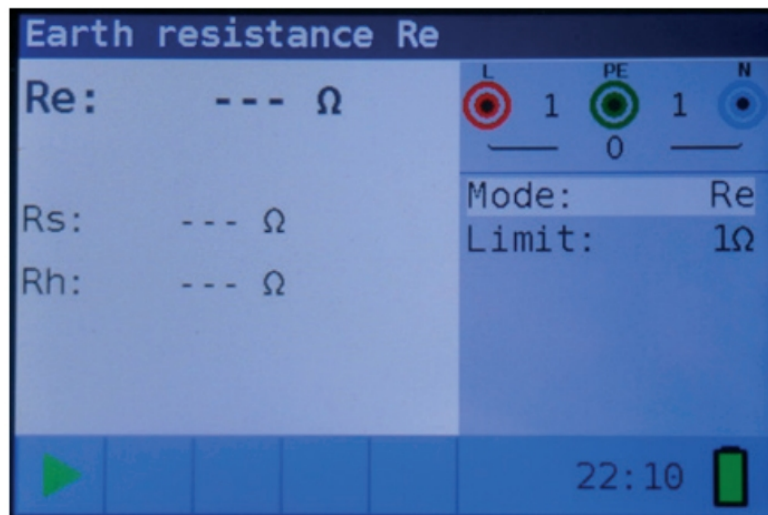
Figure 4 35: Earth Resistance (Re) measurement menu

Step 2 Set the following limit value:

- Limit:: limit resistance value using the ▲▼ and ◀▶ navigation keys.

Step 3 Follow the connection diagram shown in figures 4.36 to perform the Earth Resistance measurement with 4 wires and the connection diagram shown in figures 4.37 to perform the Earth Resistance measurement with 3 wires (ES connected to E).
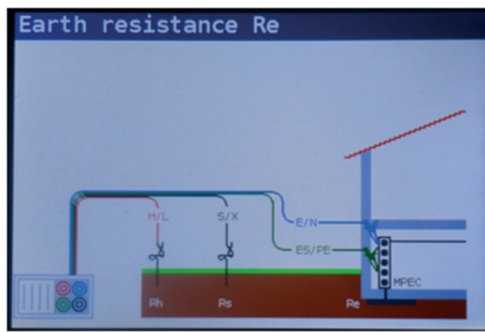
Figure 4 36: 4 wire connection diagram   Figure 4 37: 3 wire connection diagram

Step 4 Check for any warnings and the online voltage/terminal monitor on the display before starting the measurement. If everything is ok and the ▶ is shown, press the TEST key.

After performing the measurement, the results appear on the display together with the ✔ or ✖ indication (if applicable).

Figure 4 38: Example of resistance to earth measurement results

Displayed results:
Re Resistance to earth
Rs Resistance of S (potential) probe
Rh Resistance of H (current) probe

Notes:

- If a voltage of higher than 10 V exists between test terminals, the Earth Resistance measurement will not be performed.

4.8.2 Specific earth resistance (Ro)
How to perform Specific Earth Resistance measurement
Step 1 Select the Earth Resistance function with the function selector FCT key and select the Ro mode with the ▲ ▼ and ◆ navigation keys. The following menu will be displayed:

Figure 4 39: Specific Earth Resistance (Ro) measurement menu

Step 2 Set the following limit value:

- **Distance:** set distance "a" between test rods using the ▲ ▼ and ◆ navigation keys.

Step 3 Follow the connection diagram shown in figures 4.40 to perform the Specific Earth Resistance measurement.

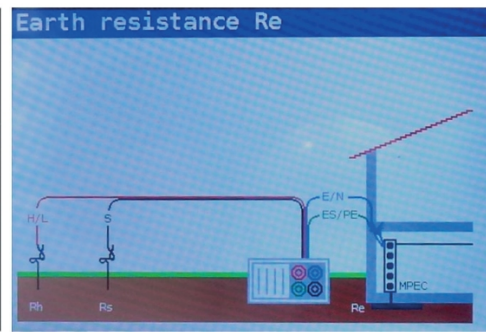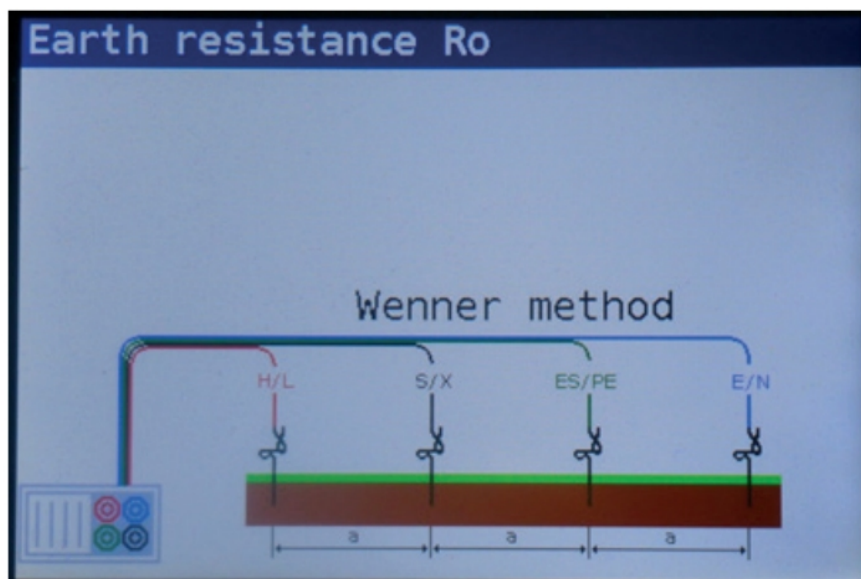**Figure 4 40: Connection diagram**

Step 4 Check for any warnings and the online voltage/terminal monitor on the display before starting the measurement. If everything is ok and the ▶ is shown, press the TEST key. After performing the measurement, the results appear on the display together with the ✔ or ✖ indication (if applicable).

Figure 4 41: Example of specific earth resistance measurement results

Displayed results:
Ro Specific earth resistance
Rs Resistance of S (potential) probe
Rh Resistance of H (current) probe

Notes:

- If a voltage of higher than 10 V exists between test terminals, the Earth Resistance measurement will not be performed.

Maintenance

5.1 Replacing fuses
There are three fuses under back battery cover of Multicheck6010.

- F3

  M 0.315 A / 250 V, 20×5 mm

  This fuse protects internal circuitry of low-value resistance function if test probes are connected to the mains supply voltage by mistake.
- F1, F2

  F 4 A / 500 V, 32×6.3 mm

  General input protection fuses for the L/L1 and N/L2 test terminals.

Warnings:

- ⚠ Disconnect any measuring accessory from the instrument and ensure that the instrument is turned off before opening the battery/fuse compartment cover, hazardous voltage can exist inside this compartment!
- Replace any blown fuses with exactly the same type of fuse. The instrument can be damaged and/or operator's safety impaired if this is not performed! The Position of fuses can be seen in figure 3.4 in chapter 3.3 Back panel.

5.2 Cleaning

No special maintenance is required for the housing. To clean the surface of the instrument use a soft cloth slightly moistened with soapy water or alcohol. Then leave the instrument to dry totally before use.

Warnings:

- Do not use liquids based on petrol or hydrocarbons!
- Do not spill cleaning liquid over the instrument!

5.3 Periodic calibration

It is essential that the test instrument is regularly calibrated in order for the technical specification listed in this manual to be guaranteed. We recommend an annual calibration. The calibration should be done by an authorized technical person only. Please contact your dealer for further information.

5.4 Service

For repairs under warranty, or at any other time, please contact your distributor. Unauthorized person(s) are not allowed to open Multicheck6010. There are no user replaceable components inside the instrument, except for the three fuses inside the battery compartment, refer to chapter 6.1 Replacing fuses.

Technical specifications

6.1 Insulation resistance

Insulation resistance (nominal voltages 50VDC,100 VDC and 250 VDC)

Range (MΩ)	Resolution (MΩ)	Accuracy
0.1 ÷ 199.9	(0.100 … 1.999) 0.001 (2.00 … 99.99) 0.01 (100.0 … 199.9) 0.1	±(5 % of reading + 3 digits)

Insulation resistance (nominal voltages 500 VDC and 1000 VDC)

Range (MΩ)	Resolution (MΩ)		Accuracy
0.1 ÷ 199.9	(0.100 … 1.999) 0.001 (2.00 … 99.99) 0.01 (100.0 … 199.9) 0.1		±(2 % of reading + 3 digits)
200 ÷ 999	(200 … 999)	1	±(10 % of reading)

Voltage

Range (V)	Resolution (V)	Accuracy
0 ÷ 1200	1	±(3 % of reading + 3 digits)

Nominal voltages	50VCC, 100 VCC, 250 VCC, 500 VCC, 1000 VCC
Open circuit voltage	-0 % / +20 % of nominal voltage
Measuring current	min. 1 mA at RN=UNx1 kΩ/V
Short circuit current	max. 15 mA
The number of possible tests wuth a new set of batteries	up to 1000 (with 2300mAh battery cells)

Auto discharge after test

In case the instrument gets moistened the results could be impaired. In such case it is recommended to dry the instrument and accessories for at least 24 hours.

6.2 Continuity resistance
6.2.1 Low R
Measuring range according to EN61557-4 is 0.16 Ω ÷ 1999 Ω.

Range (Ω)	Resolution (Ω)	Accuracy
0.1 ÷ 20.0	(0.10 Ω…. 19.99 Ω) 0.01 Ω	±(3 % of reading + 3 digits)
20.0 ÷ 1999	(20.0 Ω … 99.9 Ω) 0.1 Ω (100 Ω … 1999 Ω) 1 Ω	±(5 % of reading)

Open-circuit voltage	5 VCC
Measuring current	min. 200 mA into load resistance of Ω
Test lead compensation	up to 5 Ω
Number of possible tests with a new set of b atteries	up to 1400 (with 2300mAh battery cells)

Automatic polarity reversal of the test voltage.

6.2.2 Low current continuity

Range (Ω)	Resolution (Ω)	Accuracy
0.1 ÷ 1999	(0.1 Ω … 99.9 Ω) 0.1 Ω (100.0 Ω … 1999 Ω) 1 Ω	±(5 % of reading + 3 digits)

Open-circuit voltage	5 VCC
Corriente de cortocircuito	max. 7 mA
Test lead compensation	up to 5 Ω

6.3 RCD testing
6.3.1 General data

Nominal residual current	10 mA, 30 mA, 100 mA, 300 mA, 500 mA, 650mA, 1000 mA
Nominal residual current accuracy	-0 / +0.1·IΔ; IΔ = IΔN, 2xIΔN, 5xIΔN -0.1·IΔ / +0; IΔ = ½xIΔN
Test current shape	Sinusoidal (AC), CC (B), impulso (A)
RCD type	general (G), selective (S, time-delayed)
Test current starting polarity	0º ó 180º
Voltage range	93V-134V; 185V-266V; 45Hz-65Hz

RCD test current selection (r.m.s. value calculated to 20 ms) according to IEC 61009:

	½xIΔN			1xIΔN			2xIΔN			5xIΔN			RCD IΔ		
IΔN (mA)	AC	A	B	AC	A	B	AC	A	B	AC	A	B	AC	A	B
10	5	3,5	5	10	20	20	20	40	40	50	100	100			
30	15	10,5	15	30	42	60	60	84	120	150	212	300			
100	50	35	50	100	141	200	200	282	400	500	707	1000			
300	150	105	150	300	424	600	600	848	*)	1500	*)	*)			
500	250	175	250	500	707	1000	1000	1410	*)	2500	*)	*)			
650	325	228	325	650	919	1300	1300	*)	*)	*)	*)	*)			
1000	500	350	500	1000	1410	*)	2000	*)	*)	*)	*)	*)			

*) not available

6.3.2 Contact voltage
Measuring range according to EN61557-6 is 3.0 V ÷ 49.0 V for limit contact voltage 25 V.
Measuring range according to EN61557-6 is 3.0 V ÷ 99.0 V for limit contact voltage 50 V.

Range (V)	Resolution (V)	Accuracy
3.0 ÷ 9.9	0.1	(-0 % / +10 %) of reading + 5 digits
10.0 ÷ 99.9	0.1	(-0%/+10%) of reading

Test current	0.5xIΔN
Limit contact voltage	25 V, 50 V

6.3.3 Trip-out time
Complete measurement range corresponds to EN61557-6 requirements. Specified accuracies are valid for complete operating range.

Range (ms)	Resolution (ms)	Accuracy
0.0 ÷ 500.0	0.1	±3 ms

Test current ½xIΔN, IΔN, 2xIΔN, 5xIΔN
Multipliers not available see test current selection table

6.3.4 Trip-out current

Measurement range corresponds to EN61557-6 requirements. Specified accuracies are valid for complete operating range.

Range IΔ	Resolution IΔ	Accuracy
0.2xIΔN ÷ 1.1xIΔN (AC type)	0.05xIΔN	±0.1xIΔN
0.2xIΔN ÷ 1.5xIΔN (A type, IΔN≥30 mA)	0.05xIΔN	±0.1xIΔN
0.2xIΔN ÷ 2.2xIΔN (A type,IΔN=10 mA)	0.05xIΔN	±0.1xIΔN
0.2xIΔN ÷ 2.2IΔN (B type)	0.05xIΔN	±0.1xIΔN

Trip-out time

Range (ms)	Resolution (ms)	Accuracy
0.0 ÷ 300.0	1	±3 ms

Contact voltage

Range (V)	Resolution (V)	Accuracy
0.0 ÷ 9.9	0.1	(-0 % / +10 %) of reading + 5 digits
10.0 ÷ 99.9	0.1	(-0%/+10%) of reading

6.4 Fault loop impedance and prospective fault current
Zloop L-PE, Ipfc sub-function

Measuring range according to EN61557-3 is 0.25 Ω ÷ 1999 Ω.

Range (Ω)	Resolution (Ω)		Accuracy
	(0.20 … 19.99)	0.01	
0.2 ÷ 9999	(20.0 … 99.9)	0.1	±(5 % of reading + 5 digits)
	(100 … 9999)	1	

Prospective fault current (calculated value)

Range (A)	Resolution (A)	Accuracy
0.00 ÷ 19.99	0.01	Consider accuracy of fault loop resistance meas urement
20.0 ÷ 99.9	0.1	
100 ÷ 999	1	
1.00k ÷ 9.99k	10	
10.0 ÷ 100.0k	100	

Nominal voltage range	3.4 A, Sine wave 50Hz (10 ms ≤ tLOAD ≤ 15 ms)
Test curent (a 230 V)	93 V ÷ 134 V; 185 V ÷ 266 V (45 Hz ÷ 65 Hz)

Zloop L-PE RCD, Ipfc, non trip subfunction
Measuring range according to EN61557 is 0.46 Ω ÷ 1999 Ω.

Range (Ω)	Resolution (Ω)	Accuracy*
0.4 ÷ 19.99	(0.40 … 19.99) 0.01	±(5 % of reading + 10 digits)
20 ÷ 9999	(20.0 … 99.9) 0.1 (100 … 9999) 1	±10 % of reading

*) Accuracy may be affected in case of strong noise in the mains voltage.

Prospective fault current (calculated value)

Range (A)	Resolution (A)	Accuracy
0.00 ÷ 19.99	0.01	Consider accuracy of fault loop resistance meas urement
20.0 ÷ 99.9	0.1	
100 ÷ 999	1	
1.00k ÷ 9.99k	10	
10.0 ÷ 100.0k	100	

Nominal voltage range
93 V ÷ 134 V; 185 V ÷ 266 V (45 Hz ÷ 65 Hz)

6.5 Line impedance and prospective short-circuit current
Line impedance
Measuring range according to EN61557-3 is 0.25Ω ÷ 1999Ω.
Zline L-L, L-N, Ipsc subfunction

Range (Ω)	Resolution (Ω)		Accuracy*
	(0.20 … 19.99)	0.01	
0.2 ÷ 9999	(20.0 … 99.9)	0.1	±(5 % of reading + 5 digits)
	(100 … 9999)	1	

Prospective short-circuit current (calculated value)

Range (A)	Resolution (A)	Accuracy
0.00 ÷ 19.99	0.01	
20.0 ÷ 99.9	0.1	
100 ÷ 999	1	Consider accuracy of line resistance measurement
1.00k ÷ 9.99k	10	
10.0 ÷ 100.0k	100	

Test current (at 230 V)	3.4 A, Sine wave 50Hz (10 ms ≤ tLOAD ≤ 15 ms)
Nominal voltage range	93 V ÷ 134 V; 185 V ÷ 266 V; 321V÷485V (45Hz ÷ 65Hz)

6.6 Phase rotation
Measuring according to EN61557-7

Nominal mains voltage range	50 VAC ÷ 550 VAC
Nominal frequency range	45 Hz ÷ 400 Hz
Result displayed	Derecha: 1-2-3 ; Izquierda: 3-2-1

6.7 Voltage and frequency

Range (V)	Resolution (V)	Accuracy
0 ÷ 550	1	±(2 % of reading + 2 digits)

Frequency range 0 Hz, 45 Hz ÷ 400 Hz

Range (Hz)	Resolution (Hz)	Accuracy
10 ÷ 499	0.1	±2 digits

Nominal voltage range V ÷ 550 V

6.8 Earth Resistance
Measuring range according to EN61557-5 is EN61557-5 es 1Ohm ÷ 1999 Ω.
Re – Earth resistance, 3-wire, 4-wire

Range (Ω)	Resolution (Ω)		Accuracy*
	(1.00 … 19.99)	0.01	
1 ÷ 9999	(20.0 … 199.9)	0.1	±(5 % of reading + 5 digits)
	(200.0 … 9999)	1	

Max. auxiliary earth electrode resistance Rh	100xRE or 50 kΩ (whichever is lower)
Max. probe resistance Rs	100xRE or 50 kΩ (whichever is lower)

Rh and Rs values are indicative.

Additional probe resistance error at Rhmax or Rsmax	±(10 % of reading + 10 digits)
Additional error at 3 V voltage noise (50 Hz)	±(5 % of reading + 10 digits)
Open circuit voltage	< 30 VAC
Short circuit current	< 30 mA
Test voltage frequency	126.9 Hz
Test voltage shape	sine wave

Automatic measurement of auxiliary electrode resistance and probe resistance.
Ro – Specific earth resistance

Range	Resolution (Ωm)	Accuracy
6.0 Ωm … 99.9 Ωm	0.1 Ωm	± (5 % of reading + 5 digits)
100 Ωm … 999 Ωm	1 Ωm	± (5 % of reading + 5 digits)
1.00 kΩm…. 9.99 kΩm	0.01 kΩm	±(10% de lect.) for Re 2kΩ…19.99kΩ
10.0 kΩm…. 99.9 kΩm	0.1 kΩm	±(10% de lect.) for Re 2kΩ…19.99kΩ
100 kΩm … 9999 kΩm	1 kΩm	±(20% de lect.) for Re > 20 kΩ

Principle: $\rho = 2 \cdot \Pi \cdot d \cdot Re$, where Re is a measured resistance in 4-wire method and d is distance between the probes.
Rh and Rs values are indicative.

6.9 Datos generales

Power supply voltage	9 VDC (6×1.5 V battery cells, size AA)
Power supply adapter	12 V CC / 1000 mA
Battery charging current	< 600 mA (internally regulated)
Voltage of charged batteries	9 VCC (6×1.5 V, at fully charged state)
Charging duration time	typical 6h
Operation	typical 15 h
Overvoltage category	CAT III / 600 V; CAT IV / 300 V
Protection classification	double insulation
Pollution degree	2
Protection degree	IP 42
Display	TFT LCD de 480X320
COM-Port	USB
Dimensions (w x h x d)	25 cm x 10.7 cm x 13.5 cm
Weight (without battery)	1.30 kg

Reference conditions

Reference temperature range	10 ºC – 30 ºC
Reference humidity range	40 %HR – 70 %HR

Operating conditions

Working temperature range	0 ºC – 40 ºC
Maximum relative humidity	95 %HR (0 ºC – 40 ºC), non-condensing

Storage conditions

| Temperature range	-10 ºC – +70 ºC
Maximum relative humidity	90 %HR (-10 ºC – +40 ºC) 80 %HR (40 ºC – 60 ºC)

The error in operating conditions could be at most the error for reference conditions (specified in the manual for each function) + 1 % of measured value + 1 digit unless otherwise specified.

Storing measurements

After the measurement is completed, results can be stored in internal memory of the instrument together with the sub-results and function parameters. Multicheck6010 can store up to 1000 measurements.
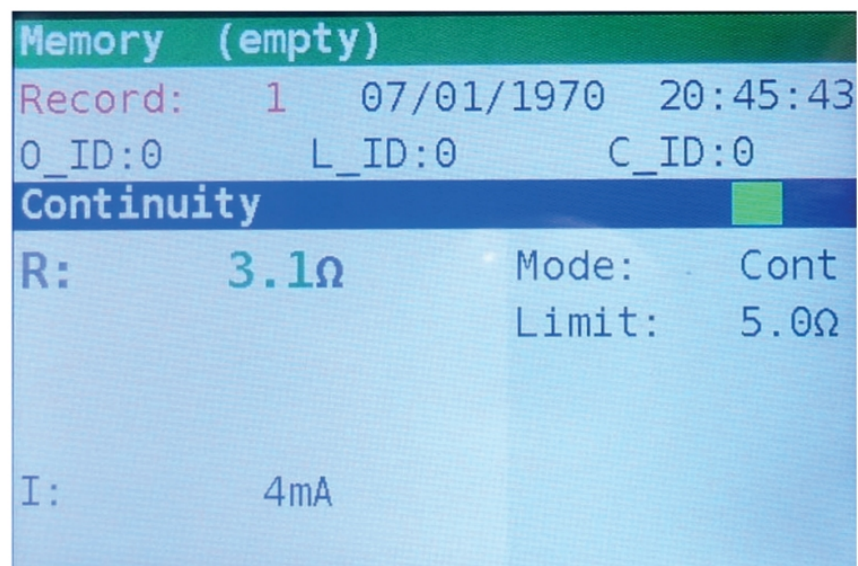
7.1 Saving results
Step 1 When the measurement is finished (Figure 7.1) results are displayed on the screen.
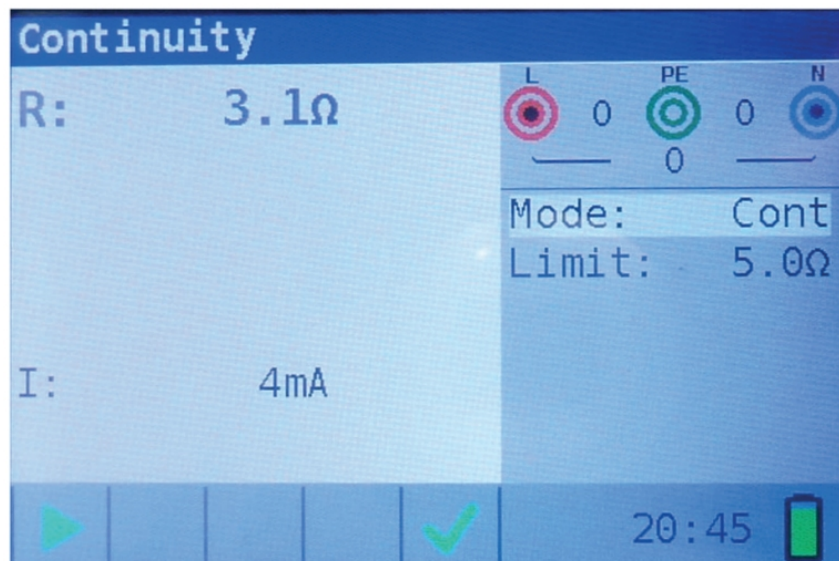
Figure 7.1: Last results

Step 2 Press the MEM key. The following is displayed (Figure 7.2):

Figure 7.2: Save results

- Next record number in red letters
- Current date (day/month/year)
- Time (hour:minutes:seconds)
- Object ID
- Location ID
- Customer ID
- Measurement function
- Measurement Results
- Measurement Mode
- Measurement Limit

Step 3 To change customer ID, location ID or object ID, press the LEFT key. The following screen will be displayed
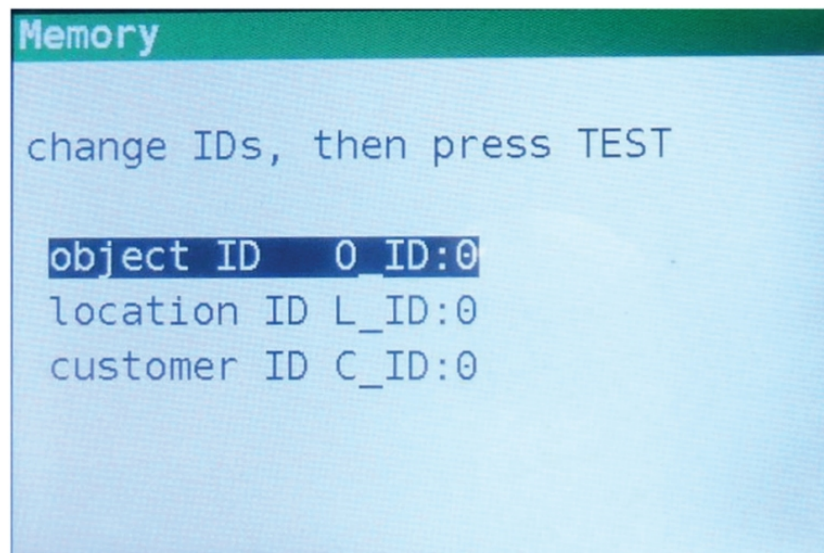
(Figure 7.3).

Figure 7.3: ID editor

Use the ▲ ▼ navigation keys to choose the ID type and the ◄► navigation keys to change the value of the ID.
Press the Exit/Back/Return key to return to the record screen without changing the IDs.
Press TEST to save the IDs in the actual record. These IDs will also be used for the following new records.

Step 4 To store the result of last measurement, press TEST key. The following will be displayed (Figure 7.4).
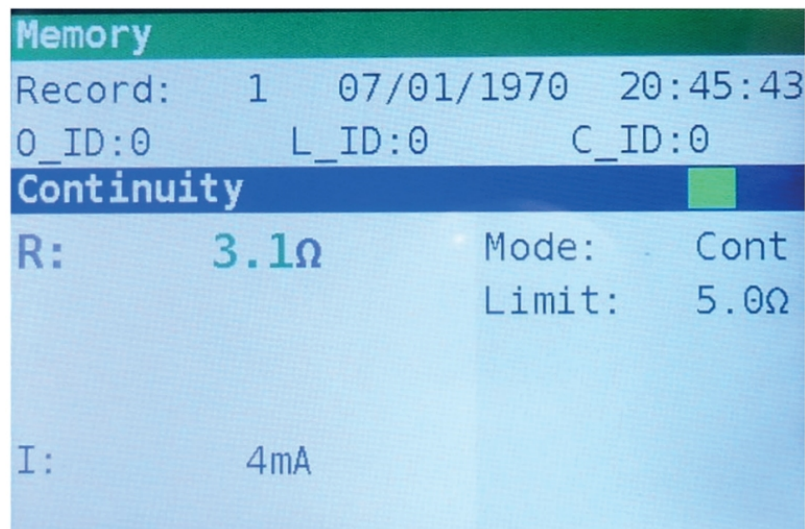

Figure 7.4: Saved results

The record number will change from red to black letters. That means that this result will be saved in memory as record 1.
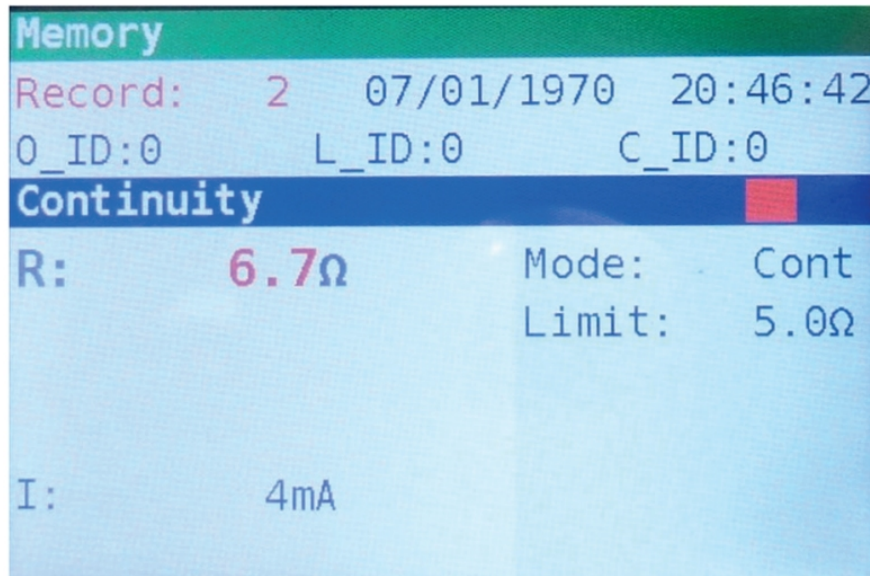Each single result can be shown in colored letters:

- Green: measured and passed
- Red: measured but failed
- Black: measured but not judged

In addition the blue function bar contains a colored field that shows the overall result of the measurement:

- Green: measured and passed

- Red: measured but failed

- Brown: measured but not judged

Figure 7.5: Failed result

To cancel the saving of the record press MEM or Exit/Back/Return key instead of TEST, the last measurement screen is then shown.

Step 5 Press the MEM or Exit/Back/Return key to return to last measurement screen or the ▲ ▼ navigation keys to see a record from the list.

7.2 Recalling results
Step 1 To enter the Memory screen press the MEM key.
When no measurement was made, the last record is directly shown.
When a measurement was made, a screen as in figure 7.2 is shown. Press then the UP or DOWN key to enter the record list.

It is possible to change the IDs of an existing record. Press the LEFT key to enter the ID editor, change the IDs and save it. These IDs will not be used for the following new records.

7.3 Deleting results
**Step 1** To enter the Memory screen press the MEM key.
When no measurement was made, the last record is directly shown.
When a measurement was made, a screen as in figure 7.2 is shown. Press then the UP or DOWN key to enter the record list.
Step 2 Press the UP or DOWN key to find the record that has to be deleted.
Step 3 Press the RIGHT key, the following screen will be displayed (Figure 7.6).
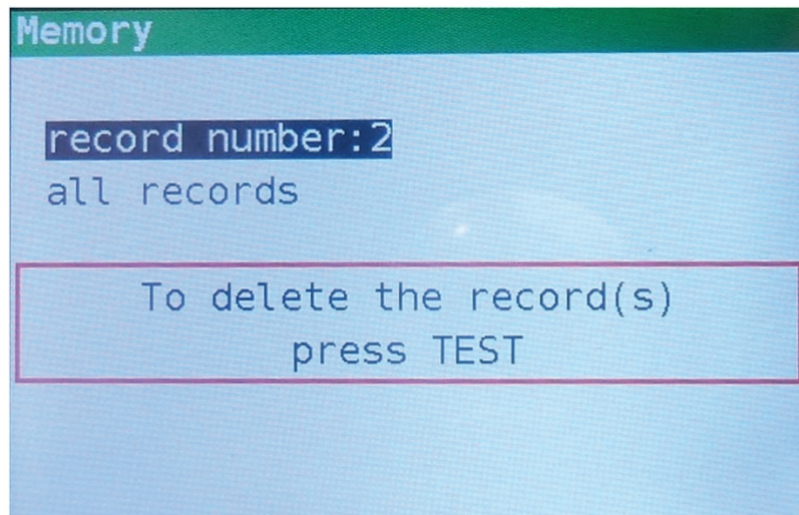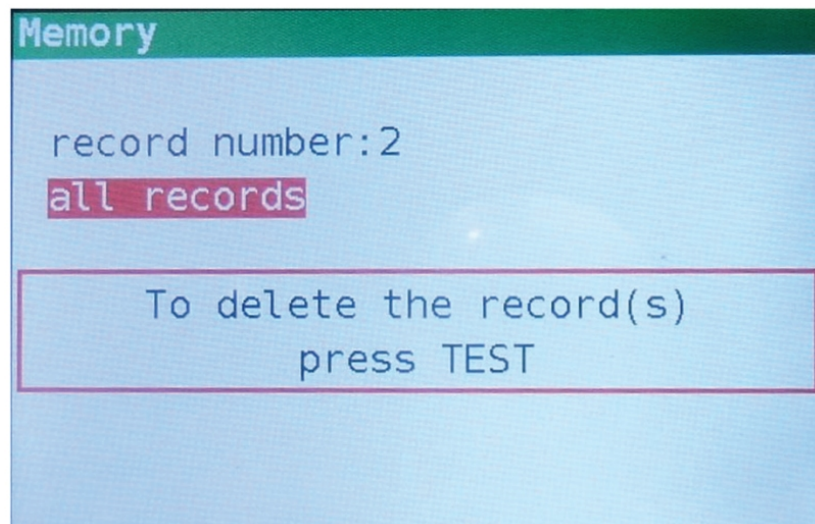
Figure 7.6: Delete screen

Step 4 Press the TEST key to delete the selected record and return to the record list or
Step 5 Press the DOWN key to select all records (Figure 7.7)

Figure 7.7: Delete screen

Then press the TEST key to delete all records and return to the measurement screen.
When a single record is deleted, its space in memory is freed and can be reused. The record number of the deleted record however is not used for new records.
When all records are deleted, the complete memory space is freed and all IDs and numbers are reset.

USB communication

Stored results can be sent to PC for additional activities like simple report creation and/or further analysis in Excel spreadsheet. Multicheck6010 connects to PC via USB communication.

8.1 MFT Records – PC software
Downloading stored records from instrument to PC is done using MFT Records application.
Records are stored on PC in form of *.csv file. Also, records can be exported to Excel spreadsheet (*.xlsx) for quick generation of reports and if required, for further analysis.
The MFT Records is a PC software running on Windows platform.

8.2 Downloading records to PC
Step 1 Disconnect all connection cables and test objects from Multicheck6010.
Step 2 Connect the instrument to your PC by means of USB connecting cable.

USB driver is installed automatically on a free COM port and confirmation that new hardware can be used follows.

Step 3 Start the MFT Records program by clicking on the Desktop shortcut icon.

Step 4 Once the software is opened, you should follow the next instructions. Click on Scan Ports (Figure 8.1)
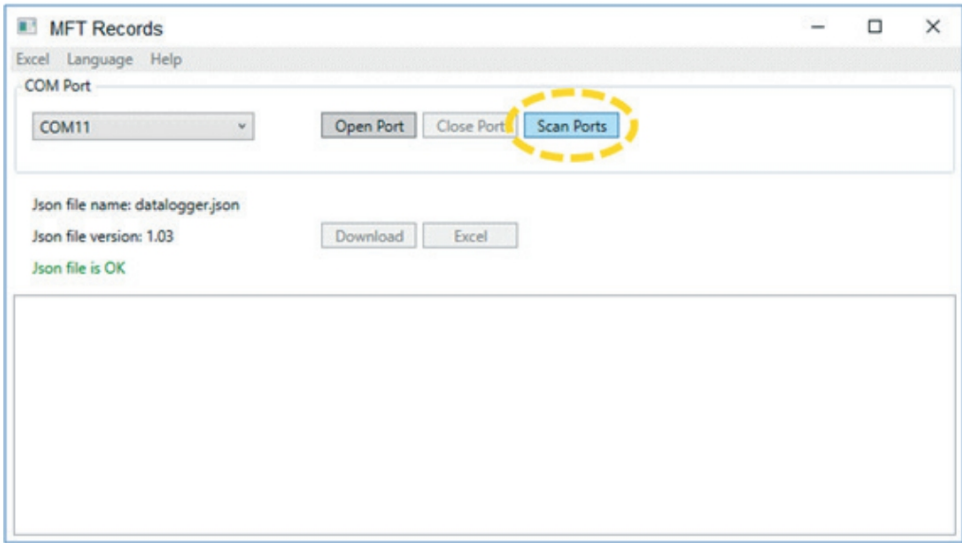

Figure 8.1: Scanning Ports

Step 5 Select appropriate port and click Open Port.

Step 6 CLICK Download to initiate data transfer. When records are downloaded *.csv file is automatically created.

Step 7 Click Excel button to export all records to Excel file.

Download the software and the complete manual from the website http://kps-intl.com

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Documents / Resources

KPS Multicheck6010 Multifunction Tester [pdf] Instruction Manual
Multicheck6010 Multifunction Tester, Multicheck6010, Multifunction Tester, Tester

References

- **KPS**
- **User Manual**